REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-78 are pending in the present application with Claims 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24-78 withdrawn from consideration. Claim 1 is amended by the present response.

In the outstanding Office Action, the election response was considered without traverse; the drawings were objected to; the specification was objected to; and Claims 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, and 23 were rejected under 35 U.S.C. § 103(a) as unpatentable over Kuno (U.S. Patent No. 6,057,671) in view of Kato et al. (Japanese Patent Application Publication No. 11-133122, herein "Kato").

Regarding the statement of the outstanding Office Action on page 2, first full paragraph, that the election response has been treated as an election without traverse, Applicants respectfully submit that the election response clearly indicated that it is with traverse and the reason for traverse was identified in the provision of MPEP § 803 that there is no undue burden to examine all the claims. Therefore, it is not clear why the outstanding Office Action ignores the election with traverse previously filed.

Regarding the objection to the drawings, Applicants respectfully submit that 37 C.F.R. § 1.83(a) states that "conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a labeled representation." Applicants respectfully submit that the steps identified by the outstanding Office Action as not shown in the drawings are conventional steps and are represented in Figure 2 by the arithmetic calculation means 218, which clearly is capable of subtracting and adding voltages. Accordingly, Applicants respectfully request this objection be withdrawn.

Regarding the objection to the specification, the specification has been amended as suggested by the outstanding Office Action. Further, paragraph [0013] has been amended to be consistent with Claim 5. No new matter has been added. Accordingly, it is respectfully requested this objection be withdrawn.

Regarding the rejection of Claims 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, and 23 under 35 U.S.C. § 103(a) as unpatentable over Kuno in view of Kato, independent Claim 1 has been amended to recite that a measuring step takes place until an end of life of a cycle test of a battery. The claim amendments find support in paragraphs [0036]-[0040] of the specification and in Figure 10 of the present application. No new matter has been added.

Briefly recapitulating, amended Claim 1 is directed to a method of confirming a battery charge amount and a degradation state. The method includes measuring at a plurality of battery temperatures a cycle test battery in respect of one selected from battery open voltage, current and voltage during discharge, and current and voltage during charging at predetermined time intervals substantially until an end of life of the cycle test battery. The method further includes using measured values to generate a determination table showing relationships between charge amounts and degradation states at prescribed time intervals, measuring a subject battery in respect of the one selected from battery open voltage, current and voltage during discharge, and current and voltage during charging, and comparing determination table values with a measured value of the subject battery to confirm a present subject battery charge amount and the degradation state in accordance with a determination table location of matching values.

Consequently, the method of Claim 1 can precisely predict the present charge amount and estimate the degradation state of the subject battery in a short time as disclosed in the specification in paragraph [0040].

Because the method of Claim 1 advantageously determines the degradation states of old and new batteries, it can prevent problems from arising between battery retailers and their customers. Further, because the claimed method can ascertain whether a battery has enough life to complete a task in an electronic instrument, the claimed method helps to conserve resources and prevent hazards caused by waste batteries as disclosed in paragraph [0111] in the specification.

Turning to the applied art, Kuno is directed to controlling a charging process to prevent excessively charging a secondary battery which is subjected to repeated charge and discharge in a specific charge state that is lower than a full charge level, thereby preventing the secondary battery from being charged excessively.

In other words, Kuno discloses a method of controlling the charging process in the secondary battery comprising the steps of: determining an electric current i1 after the elapse of a sampling time dti; repeatedly executing the integration of a discharging current in the discharging state in an interval of the sampling time dti until the elapse of time t exceeds a preset time period dt; obtaining a mean discharge current iav by dividing the sum of the electric currents itot by the total discharge time tdc; measuring a temperature T1 of the battery; calculating the temperature gradient (dT/dt) by using T1 and T0; correcting the temperature gradient (dT/dt) to a value relating to only the charging process through subtracting a correction amount α from the temperature gradient (dT/dt); and comparing the corrected temperature gradient (dT/dt) with a preset temperature gradient Thr1, as disclosed by Kuno (from line 14 in column 14 to line 29 in column 18 and shown in Figure 10).

Furthermore, Figure 13 of Kuno shows time-based variations in the electric current, voltage, and temperature of the battery in the course of charging. Figure 14 of Kuno shows time-based variations in the electric current, voltage, and temperature of the battery in the case of repeated charge and discharge.

However, each method of confirming a battery charge amount disclosed in Kuno fails to include the step of measuring a cycle test battery in respect of battery open voltage, current and voltage during discharge, and current and voltage during charging at predetermined time intervals substantially until the cycle test battery end of life. Furthermore, Kuno does not teach or suggest a determination table showing relationships between charge amounts and degradation states at prescribed time intervals through using measured values during charging at predetermined time intervals substantially until the cycle test battery end of life.

Kato discloses a general-purpose method and apparatus capable of simply measuring the residual quantity of a battery. Kato discloses a method including the steps of: applying a load corresponding to use conditions of that battery to a battery targeted for measurement of an initial voltage fall; obtaining a quadratic equation $V=at^2+bt+c$ (wherein 'a' and 'b' denote coefficients and 'c' denotes a no-load voltage V_0) approximating a discharge curve of that voltage from data of two values (V_1, t_1), (V_2, t_2) between a voltage 'V' and a discharge time 't'; applying thereto a temperature correction or the like; inputting thereto a threshold V_R equivalent to the discharge limit voltage in order to obtain an effective discharge time t_R; and displaying the residual discharge time on a display part.

Furthermore, according to a cell class and a temperature of an operating environment described by Kato, a temperature compensation multiplier α is chosen from the temperature compensation multiplier table and the above equation is compensated for by multiplying the quadratic term of the above equation by the multiplier α as shown in Figure 3 of Kato. According to the cell class, the voltage drop correction factor β is chosen from the voltage drop correction factor table, as shown in Figure 4 of Kato and the above equation is compensated for by multiplying the primary term of the above equation by the factor β.

However, neither the temperature compensation multiplier α nor the voltage drop correction factor β of Kato is decided by measuring a cycle test battery in respect of battery

open voltage, current and voltage during discharge, and current and voltage during charging at predetermined time intervals substantially until the cycle test battery end of life as required by amended Claim 1. Furthermore, Kato does not teach or suggest a determination table showing relationships between charge amounts and degradation states at prescribed time intervals on the basis of measured values during charging at predetermined time intervals substantially until the cycle test battery end of life.

Accordingly, it is respectfully submitted that independent Claim 1 and each of the claims depending therefrom patentably distinguish over Kuno and Kato, either alone or in combination.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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